Conducting Exemplary Educational Research in Computing to Support CS for All

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ABSTRACT

This 2-hour workshop will focus on sharing the recently created set of guidelines for conducting high-quality, equity-enabling education research in computing. This event is directed towards new and experience education researchers who want to learn more about characteristics of high-quality education research, how to go about conducting research that meets these characteristics, and how to center the participants and their lived experiences throughout the research process. Participants will learn about the guidelines and associated resources, discuss their application to current or proposed research projects, and gain a new appreciation for how to embed equity perspectives in each phase of their research. Specifically, participants will develop personal positionality statements and improve their ability to write research questions, and use critical theoretical frameworks.

CCS CONCEPTS

• **Social and professional topics** → **Computing education**; **Computing education programs**; **Computer science education**.

KEYWORDS

Computer science education research, computing education, research, guideliens, equity, high quality

1 INTRODUCTION

Computer science education research that impacts all students goes well beyond who is included in studies. It must come to terms with the researchers' sets of assumptions surrounding reality and knowledge of power dynamics [1], the role of values in research (axiology), and the dominant knowledge and power relationships [7]. Using particular research methods (e.g., ethnographic research) can contribute to equity and social justice in education [2]. Pearson et al. note that "STEM fields have a history of conducting research, creating theories, and making measurements that primarily centered white, cisgendered, male, heterosexual, able-bodied, wealthy

individuals" [6, p. 3]. Prioritizing "the unique ontological, epistemological, and axiological positioning" of participants can further enable efforts to create equity-enabling education research that reflects their lived experiences [7]. Montecinos notes that, in studies with all White participants, not presenting this information within publications makes "Whiteness" invisible, which by default then secures the norm of Whiteness [4, 5]. Similarly, Fernandez), referring to medical education research, notes that research should go beyond the mean impact and be purposeful and intentional in examining the wide range of promising practices for subgroups of learners that are defined by learning characteristics (e.g., prior learning experiences) as well as demographic-related cultural characteristics [3].

Based on the need for more education research approached with an broader lens that strengthens the quality of the research , this event will be a hands-on, in-person workshop that emphasizes several key learning goals. We provide the content area, measurement items, and workshop structure. The times also include time for attendees to ask questions. This event will support the capacity of CS education researchers who care about producing high-quality research and the evidence needed for decision makers to make decisions about policy, curriculum, and pedagogy that are based on evidence that centers the participants. Specifically, participants will develop personal positionality statements and improve their ability to write research questions, and use critical theoretical frameworks.

2 MODULES

We will present several modules during this workshop.

2.1 Module 0 - Introduction

We will take the first 10 minutes to frame the workshop.

- Focus area: Introductions, definitions, and framing for the training. At the end of this module, attendees will be able to
  - Describe why high-quality, equity-enabling education research is important
  - Describe characteristics of high-quality research
  - Describe characteristics of equity-enabling research
  - Describe impacts of conducting and not conducting high-quality and equity-enabling research
- Workshop elements
  - 10 minutes - Start with prompt for 1, 2, 4 discussion method of characteristics of "high quality"
  - 10 minutes - Facilitators share remaining framing for the workshop

2.2 Module 1 - Your Place in Research

We will spend 30 minutes focusing on researcher reflexivity and positionality. At the end of this module, attendees will be able to

Identify the expansive intersection of identities needed to understand their full positionality and write a positionality statement with a subset of those identities; explain how researcher reflexivity can improve their research; and explain how researcher well-being impacts their research. Our workshop will:

- Start with prompt for defining different identities and how they may impact a learning experience
- Facilitators define positionality and reflexivity in research
- Participants identify and reflect upon at least one aspect of their positionality and how it may impact their research
- Share one identity (for those who want to share with the group)
- Case study presentation of research scenario
- Discussion of the identities that might influence the research study
- Relate the case study back to the shared identities

2.3 Module 2 - Empowering Questions, Inclusive Visions

The focus area of module 2 is framing problems and research questions. At the end of this module, attendees will be able to use preexisting research, data, and community voice to frame a problem statement; write a research question that explicitly connects one or more factors (including participants, power, history, socio-cultural context, and issues of equity) to the problem and that will inform knowledge base, policy, or practice in a way that promotes further study or action to address the findings. They will also be able to write a research question (or primary question and subquestions) with an explicit equity focus and identify the need for, and value in, diverse voices in the research design as well as in the ongoing evaluation, reflection, and data analysis stages of research. Especially important are experts in the lived experiences of the community as well as the methods and approaches connected to the type of question being addressed by the research.

Workshop elements will include:

- Discuss ways to include participant situational contexts in the research problem framing, including asset versus deficit based approaches, using an example of case study of one research problems and corresponding questions, including reflective prompts for participants to discuss
- Provide a new case for participants to create a framing and corresponding research questions and then discuss as a group.

2.4 Module 3 - Critical framework

In this module, we will focus on how to choose and use critical theoretical and conceptual frameworks in research that match the situational contexts of study participants. At the end of this module, attendees will be able to explain why critical frameworks are important (and what it means when they aren't used) and when to identify/apply them (in design and not just the paper writing stage); find and build understanding of critical frameworks within and outside of computing education research; and select and apply a framework.

Workshop elements include:

- Facilitators will discuss the value of frameworks, the difference between theoretical and conceptual frameworks, common frameworks in education research for various situational contexts, and where to find them
- Case studies. Pairs of participants will be given two cases and 6 frameworks; participants will discuss which framework they would choose for each scenario and why
- Facilitators will discuss how to apply frameworks to education research

2.5 Closing

During the closing, we will answer remaining questions, discuss where to find additional resources, challenge participants to commit to one aspect of these guidelines to focus on the next six months.

3 PRACTICAL REQUIREMENTS

We would like discussion tables of no more than eight, if possible.

4 PREVIOUS OFFERINGS

Although the supporting materials for the workshop were created by an international working group at [anon], so far it has only been offered in the U.S. Various presenters have held the workshop at National Association of Research in Science and Technology (NARST) 2024 (12 participants), ACM SIGCSE 2024 (47 participants), and American Society of Engineering Education (ASEE) 2024 (to be held in late June 2024). Our end of workshop survey has indicated that the workshop has been engaging and attendees learned practical ways to focus on all students and to consider how they influence their research.

5 KEY TAKEAWAYS

Overall, participants will takeaway the importance of how their own lived experiences impact their research, how to write research questions in ways that honor participants, and the importance of using critical theoretical frameworks.

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